

# BOSTON TRANSPORTATION DEPARTMENT

## GENERAL NOTES

May 31, 2017

1. All equipment shall conform to the Boston Transportation Department specifications and installation procedures except as noted.
2. The contractor shall furnish and install complete in place and ready to operate a traffic control system.
3. Signal cable, where required, shall conform to I.M.S.A. Specification 19-1, solid, latest revision. Number of wires in each cable run and sealed connections using wire nuts in signal, mast arm and span pole bases shall conform to Commonwealth of Massachusetts Standard Specifications for Highway and Bridges (latest revision). No more than two (2) signal cables are to be connected in any signal base unless otherwise directed by the BTD Engineer. All signal cables shall be labeled in the control cabinet by the contractor. The permanent labels shall include post number(s) and a letter designation for use on F28 wiring documentation.

All wiring from mast arm bases to mast arm or span with signal housings shall be I.M.S.A. 19-1, #16 A.W.G., stranded. For housings not on mast arms or span wires, separate wires for each circuit shall be installed from the housing to the signal base.

4. a) Electric service connection shall be 115 V.A.C. one #6 lead and one #6 bare.  
b) The contractor shall initiate and make all arrangements with the electric utility company, for all work in the electric manhole system. The contractor shall bear the cost of such work including the electric utility company supervision charges.  
c) The contractor shall make arrangements with the electric utility company to disconnect the existing service connection and shall bear the cost of such work.  
d) When electric service is to be provided from overhead electric lines, the contractor shall furnish and install a rigid metallic riser and necessary adapters to underground conduit per requirements of the electric utility company and the National Electric Code.

The riser shall be of a size which will accommodate interconnect cable when this is required as part of the installation.

5. The contractor shall provide and attach, in a suitable manner, identification tags for traffic signal control boxes as per Boston Transportation Department Plan A-23, latest revision. These tags shall be attached to the front of the control box with BTD intersection number as indicated on the signal layout plans.
6. All pedestrian signals shall be mounted so that there is a minimum horizontal clearance of at least six inches between any part of the housing or visor and the outer face of the curb.

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7. Ground and bonding wire, shall be installed between all signal posts and the control box where signal cable is installed. The ground and bonding wire shall be copper, #8 AWG or larger conforming to requirements of ASTM B3 for soft or annealed copper wire, ASTM B8 for stranded copper wire. An existing ground and bonding wire may be reused if approved by the engineer.
8. All splices shall be made with 3M splice kits using resin #2114. Splices shall not be permitted in signal or interconnect cables.
9. a) Housings mounted on the side of standard type 3 poles shall be with pole clamps and shall fit the contour of the pole, except slip fitters may be used in place of the top clamp.  
  
b) For housings mounted on the side of mast arm poles, strapping may be used with appropriate hardware for all fittings except the one(s) for the wire way(s) which shall be a pole clamp.
10. All traffic signal posts, mast arms, and control cabinets shall be field located by the Boston Transportation Department engineer.
11. Templates for positioning anchor bolts and rods to be supplied by the contractor.
12. The contractor shall be required to keep records of dates when traffic signal posts removed and installed and when traffic signals are put on flashing, stop and go, or "all out." These records are to be submitted to the engineer. A copy shall be transmitted to the Boston Transportation Department by the first of each month.
13. a) After the contractor begins construction at the intersection, it shall be the contractor's responsibility to maintain the existing traffic signals until they are removed. During an installation period where existing and new signals are present, the contractor shall maintain both.  
  
b) When the contractor completes all work at an intersection, BTM shall be notified in writing that the intersection is ready for final inspection by BTM. The contractor will be provided a list of items to be corrected. After these items are completed to the satisfaction of BTM, a written acceptance letter will be provided to the contractor that the responsibility for maintenance of the intersection will be returned to BTM.
14. a) In advance of the loop detector installation, the contractor shall mark, on site, the loop detectors with any necessary changes required by field conditions such as manholes. The loop detector layout shall be inspected and approved by the engineer before the loop detectors are installed.

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- b) The 3/8 inch saw cut for wire loop detectors in bituminous concrete pavement shall be made as shown on Boston Transportation Department Plan A11.1, latest revision, and the loop wire installation shall conform to the requirements of Boston Transportation Department plan A12.4, latest revision.
- c) Slots in the bituminous concrete pavement shall be cut with a concrete sawing machine to a uniform depth as shown in the Boston Transportation Department's details and as required to accommodate all necessary loop turns or leads. Diagonal saw cuts of at least twelve inches in length shall be made at each corner to prevent sharp bends in the wire. The diagonal cuts shall overlap the main cuts so that each wire-bearing slot has full depth.
- d) Dry cutting blades will not be allowed.
- e) Before installing the loop wire, the saw cut shall be cleared of debris and thoroughly dried. The wire shall be inserted in the cleared, dried slot with a blunt wooden or plastic tool that will not damage the insulation.
- f) Loop wire crossing joints or noticeable cracks shall be protected with an approved insulating sleeve continuously for at least six (6) inches on each side of the joint or crack. The objective is to prevent bonding of the wire to the pavement. The ends of the sleeving material shall be taped to prevent entry of slot sealing compound into the sleeving. Said sleeving shall be furnished and installed at no extra cost and shall be incidental to the induction loop item. The end of the 1 1/2 inch PVC conduit shall be plugged with an approved material and loop wires entering the conduit shall be sleeved and taped as above.
- g) No splice shall be used in the installation of any inductive loop or its lead-in to the appropriate pull box. Loop lead-in wire will be spliced to the loop in the handhole or pull box and will be installed to the controller cabinet without any additional splices. Splices shall be soldered and made completely watertight. The splice shall include the loop lead-in shield so that isolation of the shield from ground will be maintained.
15. a) The traffic signals shall remain on stop and go operation with adequate indications as determined by the engineer. Temporary signal indications as necessary to meet this requirement shall be supplied by the contractor at no additional cost.
- b) The contractor shall provide response to reported traffic signal failures within two (2) hours.
16. All loop detectors shall meet the requirements of the Boston Transportation Department Loop Detector Test Procedure dated May 23, 1978. Testing shall be done a minimum of two (2) weeks after initial installation or repairs.

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17. All interconnect cable shall be as per Boston Transportation Department interconnection system notes, latest revision. All cable including those existing at the time of the control cabinet installation, shall be labeled by the contractor. The permanent labels shall indicate origin of each cable and pair assignments including modem numbers. For existing cables, BTM will provide existing pair assignments to the contractor.
18. In the control box a laminated label shall be attached inside cabinet which identifies the street name, direction, movement and the phase(s) to which the output of the amplifier feeds.
19. In the control box where detector feeder cables are terminated, all detector leads shall be supplied with identification tags which specify the street name, direction and movement of the loop to which the feeder cable is connected. The tag and its attachments shall be of a durable material such as brass or plastic.
20. The existing traffic signal equipment is to be removed and delivered to the Boston Transportation Department Signal Maintenance Facility at 12 Channel Street, South Boston. Contractor shall disassemble posts from pedestals and disassemble housings and cabinet from posts. The electrical leads shall remain intact. Shelf mounted equipment shall be removed from the control cabinet and transported separately from the cabinet.
21. The Boston Transportation Department engineer shall be notified forty-eight (48) hours prior to any interconnect/fiber cable or traffic signal work. If work at a location is discontinued, the Boston Transportation Department engineer shall be again notified twenty-four (24) hours before work is resumed.
22. The contractor shall, within thirty (30) days after award of the contract, forward to the engineer a copy of a confirmed purchase order *from the manufacturer* for the controller unit in cabinet assembly, housings, video monitoring system, signal cable, interconnect cable, fiber, loop detector amplifiers and any other equipment required per plans with an estimated delivery date.
23. All push buttons shall face the inside of sidewalk unless otherwise directed by the Traffic Engineer of the Boston Transportation Department.
24. Loop detector lead-in cable shall be per I.M.S.A. specification 50-2 (latest revision).
25. Vehicle housings which have been installed but not yet energized shall be faced away from all traffic and bagged.
26. The contractor shall provide written notification to the Boston Transportation Department when traffic signal work is complete so that the finished work can be inspected prior to contract completion.

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27. a) The Contractor shall prepare "as built" signal cable wiring charts to be recorded on Boston Transportation Department Form F28A.  
  
b) The contractor shall provide "as built" traffic signal drawings which consist of a traffic signal plan, interconnect/fiber plan, timing & sequence plan and pavement marking & sign plan in electronic format utilizing BTD AutoCAD standards. The "as-built" drawing shall include information specified in Mass Highway Department specification 815.67 in addition to requirements in BTD specifications. These items shall be supplied to the Boston Transportation Department prior to project acceptance.
28. For intersections under computer control, the contractor shall make temporary connections as necessary so that computer control of the traffic signals and related system detectors shall be maintained at all times. Where existing sensors are to be replaced, the new sensors shall be operational within twenty-four (24) hours after removal of existing ones.
29. Steel mast arm calculations shall be pole specific indicating/referencing the pole location and plan designation and the actual loading from both signal design sheets and sign sheets for the proposed installation.
30. For intersections with a video monitoring system, the contractor shall make temporary connections as necessary so that remote viewing and PTZ control of the video camera(s) shall be maintained at all times. Where existing video monitoring systems are to be replaced, the new system shall be operational within twenty-four (24) hours after removal of the existing one.
31. Pedestrian ramps shall be constructed in conformance with plans and standard details. All ramps shall comply with ADA requirements. The contractor shall verify grades prior to ramp construction in coordination with the City of Boston Public Works Department. Any newly constructed ramp which is found to be noncompliant shall be reconstructed by the contractor at no additional cost to the city.
32. All equipment supplied shall be year 2000 compliant. The Contractor represents and warrants that the information technology for the device(s)/component(s) is Year 2000 compliant. Year 2000 compliant means information technology that accurately processes date/time (including, but not limited to, calculating, comparing and sequencing) from, into, and between the twentieth and twenty-first centuries, and the years 1999 and 2000 and leap year calculations. Furthermore, Year 2000 compliant information technology, when used in combination with other information technology, shall accurately process date/time data if the other information technology properly exchanges date/time data with it. This warranty shall survive the expiration or termination of the Contract under which the device(s)/component(s) is purchased.